Fall 2017 – STEM 4033 - Tentative Schedule

***Please keep in mind that this is a tentative schedule. Please check the http://www.uastem.com website for updates.**

Week 1

Tuesday, August 22

- Introduction via Earth Ball – Land vs. Water Activity
  - https://www.jpl.nasa.gov/edu/teach/activity/ocean-world-earth-globe-toss-game/
- Syllabus Review
- Intro to STEM Education PP
- Readings: *STEM Education It's Elementary* and *Intel Foundation: Changing Attitudes is Key in STEM Education* articles

Thursday, August 24

- Reading Review
- Intro to STEM Education PP (cont.)
- Touchdown Design Challenge
- Readings: Ch. 1 - Introduction and Background and History of the STEM Movement in *The Overlooked STEM Imperatives*, *Many High Schoolers giving Up on STEM* and Elementary Teachers and the Crisis in STEM Education articles

Week 2

Tuesday, August 29

- Reading Review
- Space Frame Challenge (using simple tools and materials)
- Reading: Preface and Chapter 1. Why Project Based Learning? (pgs. 1-23) in PBL text and Chapter 2 – Power and Promise of STEM Education in the *The Overlooked STEM Imperatives*

Thursday, August 31

- Reading Review
- Space Frame Challenge Testing and Discussion
- The Design Loop PP
- The Design Process – The Dog Bone Slinger
- Assignment 1 – Creating a Design Loop (Due September 5)
- Reading: Appendix A. Project Snapshots (pgs. 177-121) in the PBL text and A Framework for STEM Problem Solving

Week 3

Tuesday, September 5

- Reading Review
- Design Loop Presentations
- Reading: Chapter 2. What Is Gold Standard PBL? (pgs. 24-53) in the PBL

Thursday, September 7

- Reading Review
- Curriculum Design and Assessment PP
- Narrative Curriculum Assignment (Due September 21)
- Reading: Chapter 3. What Does the Research Say about Project Based Learning? (pgs. 54-65) in the PBL text and Chapter 3 – 'T' and 'E' in STEM in the *The Overlooked STEM Imperatives*

Week 4

Tuesday, September 12

- Reading Review
- Curriculum Design and Assessment PP (continued)
- Assignment 2 - Narrative Curriculum Development Project(Due September 21)
- Reading: Chapter 4. Designing a Project (pgs. 66-98) in the PBL text and Writing a STEM Design Brief and Toward Narrative-Centered Learning Environments

Thursday, September 14

- Reading Review
- Curriculum Design and Assessment (continued)
- Reading: Integrating Literacy and Engineering Instruction for Young Learners

Week 5

Tuesday, September 19

- Reading Review
- Curriculum Design and Assessment (continued)
- Rubric Planning Sheet, Engineering Journal Booklets, Design Logs
- Reading: Performance-Based Assessment Guide

Thursday, September 21

- Narrative Curriculum Assignment Due
- Presentations of Narrative Curricula
- Reading: Chapter 5. Managing a Project (pgs. 99-131) in the PBL text

Week 6

Tuesday, September 26

- Technical Procedural Problem Solving PP
- Writing a Technical Procedural STEM Problem handout/reading
- Assignment 3 - Technical Procedural Curriculum (Due October 5)

Thursday, September 28

- Technical Procedural Design Challenge - Teacher Geek – Rubber Band Racer
- Reading: Chapter 6. Leading a PBL Implementation Effort (pgs. 132-158) in the PBL text

Week 7

Tuesday, October 3

- Technical Procedural Design Challenge (continued)

Thursday, October 5

- Technical Procedural Curriculum Assignment Due – Presentations
- Using Blocks and Construction Toys for Teaching STEM PP
- Assignment 4 - Construction Blocks Curriculum Project (Due October 24)
- Readings: Chapter 7. PBL in Informal Education and Summer Programs (pgs. 132-158) in the PBL text, Using Block Play and Blocks as a Tool for Learning

Week 8

Tuesday, October 10 – No Class - ISEA (October 8-10)

-Alternative assignment for students not attending the ISEA Conference -

Thursday, October 12

- Reading Review
- Keva Maze Design Challenge
- KEVA Resources

Week 9

Tuesday, October 17 – No Class – Fall Break (October 16-17)

Thursday, October 19

- Construction Block Curriculum Team Development

Week 10

Tuesday, October 24

- Construction Block Curriculum Assignment Due – Presentations
- Lego WeDo Robotics – Bring laptops to class

Thursday, October 26

- Lego WeDo Robotics – Bring laptops to class
- Reading: *Why Creativity Now – A Conversation with Sir Ken Robinson*

Week 11

Tuesday, October 31

- Reading Review
- Teaching Creativity PP
- Assignment 5 - Creativity Project

Thursday, November 2

- Creativity Assignment Due
- The Quick Challenge PP
- Quick Challenge Sample
- Quick Challenge Checklist
- Assignment 6 - Quick Challenge Project

Week 12

Tuesday, November 7

- Quick Challenge peer review
- Introduction to Electricity
- Reading: Chapter 1: http://www.allaboutcircuits.com/vol_1/index.html
- Building electrical circuits
- Assignment 7 - Holiday Themed Electricity Curriculum Project

Thursday, November 9

- Building electrical circuits– Lab day

Week 13

Tuesday, November 14

- Building electrical circuits– Lab day

Thursday, November 16 - No Class – Mississippi Valley Conference (November 16-17)

Week 14

Tuesday, November 21

- Electricity Curriculum Assignment Due – Presentations
- Introduction to Paper Engineering
- Assignment 8 – Paper Engineering/Pop-Up Card Project

Thursday, November 23 – No Class – Thanksgiving (November 22-24)

Week 15

Tuesday, November 28

- Paper Engineering
- Pop-Up Card Assignment

Thursday, November 30

- Pop-Up Card Assignment Due – Presentations
- Scientific Inquiry and Engineering Design – Using scientific evidence to inform design
- Assignment 9 – Inquiry and Design Curriculum Project

Week 16

Tuesday, December 5

- Scientific Inquiry and Engineering Design – Using scientific evidence to inform design

Thursday, December 7

- Scientific Inquiry and Engineering Design – Using scientific evidence to inform design

***December 8 – Razorback STEM (Big Cat) Challenge – Alternate Final Project**

Final Exams

11:00-12:15 - Tuesday, December 12 – 10:15-12:15
3:30-4:45 - Tuesday, December 12 – 3:00-5:00

Textbook:
Larmer, J. , Mergendoller, J, & Boss, S. (2015). Setting the Standard for Project Based Learning: A Proven Approach to Rigorous Classroom Instruction. ASCD: Alexandria, VA.

- Chapter 1. Why Project Based Learning?
- Chapter 2. What Is Gold Standard PBL?
- Chapter 3. What Does the Research Say About Project Based Learning?
- Chapter 4. Designing a Project
- Chapter 5. Managing a Project
- Chapter 6. Leading a PBL Implementation Effort
- Chapter 7. PBL in Informal Education and Summer Programs
- Conclusion
- Appendix A. Project Snapshots

Evaluation:

1. **Curriculum Development/Presentation and Design Challenges (800 points):** Each candidate will develop and present STEM lessons and/or design activities related to integrated STEM education throughout the course. These projects include:
    1. Design Loop Assignment (50pts.)
    2. Narrative Curriculum Design Challenge (150pts.)
    3. Technical Procedural Curriculum Design Challenge (150pts.)
    4. Construction Block Curriculum Design Challenge (100pts.)
    5. Creativity Assignment (50pts.)
    6. Quick Challenge Curriculum Design (50pts.)
    7. Electrical Circuits Curriculum Design Challenge (150pts.)
    8. Paper Engineering (50pts.)
    9. Using Scientific Evidence to Inform Design Project - Outline (50pts.)

2. **Daily Assignments (200 points):** Candidates will be required to *participate* in ongoing weekly and in-class discussions, in/out of class lab activities, design and engineering activities, and other assignments.

3. **Final Project (100 points)**